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United States Department of Agriculture
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Bureau of Entomology and Plant Quarantine

X A BUCKET SAMPLER FOR SURFACE GRAIN
IN ELEVATOR BINS X

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In connection with an investigation of the insect problems of line or country elevators, a sampling device was needed for surface grain in bins that are partially filled, the distance to the grain sometimes being nearly a hundred feet. Such a device was constructed and has been termed the "bucket sampler." It is adapted for the surface sampling of various grains or milled products that are stored in otherwise inaccessible places. The sampler (fig. 1) constructed according to the following specifications will draw approximately 1 gallon of grain.

Construction

The sampler is made of No. 20-gage galvanized iron. One side is 12 inches long and 19 inches wide and the other side 11 7/8 inches long and 18 inches wide. The ends are two semicircular pieces, one 8 5/8 inches in diameter and 5 inches wide and the other 8 1/2 inches in diameter and 4 1/2 inches wide. This difference in size allows one half to fit into the other, thus insuring a tight closure.

A small semicircle (V in B) may be cut into one of the end pieces to provide an opening from which the sample may be poured. Two 4-inch strap hinges are riveted to both sections to fasten them together (F in A). The hinge placement should be made when the sampler is in closed position (B).

An adjustable screen-door spring (D in C) is attached through two small holes drilled opposite each other (J in B and C). The cut end of the door spring is threaded through one of the holes, and the adjusting screw is inserted through the other (J in C).

A lock-joint mechanism (H in C), which locks when flexed outward, is attached. This mechanism is of the type used on the trunk compartments of some of the older model automobiles. It is pin-hinged at the center and at both ends. The size and type of joint may vary, but it should be constructed of rigid metal and the extended length should be approximately 16 inches. A 3/16-inch hole is drilled at a point 2 inches from the center

joint for the attachment of a trigger (T in C). The lock joint is attached inside the sampler, about 2 inches below the lip of the larger half and 2 1/2 to 3 inches below the lip of the smaller half. A coil-type spring (S in C) puts a slight tension on the lock joint and automatically locks the sampler in the open position. Other types of springs may be substituted if desired. When the sampler is in the closed position, the apex of the lock hinge extends outside the bucket proper. To receive this extension, a slot is cut where the apex of the hinge touches the back side of the bucket when approaching the closed position. This opening is loosely covered with a leather cap (L in A), riveted in place.

The trigger, 1 1/4 by 5 inches, is cut from No.20-gage sheet metal. One end is bent at a right angle to form a 2-inch boot for contact with the grain. A slot may be cut in the other end for proper adjustment. Sturdy screen-door handles (P in A, B, and C) are attached for use in opening the sampler. The door spring (D in C) is adjusted by tightening or loosening the adjusting screw (J in C) so that the sampler closes firmly and completely, but not abruptly, as it encloses the grain from the surface being sampled.

Operation

To operate the sampler the handles are pulled laterally. This cocks the trigger mechanism. The open sampler is lowered to the surface of the grain by means of a light rope (woven clothes line) attached by a swivel and two small chains, which are bolted on the hinged side of the sampler (fig. 2). When the bucket sampler comes in contact with the surface grain, pressure on the trigger unlocks the hinge joint and allows the door spring to close the sampler, thus trapping the grain as it closes. The sampler is then withdrawn and the sample poured from the opening (V in B) into a container.

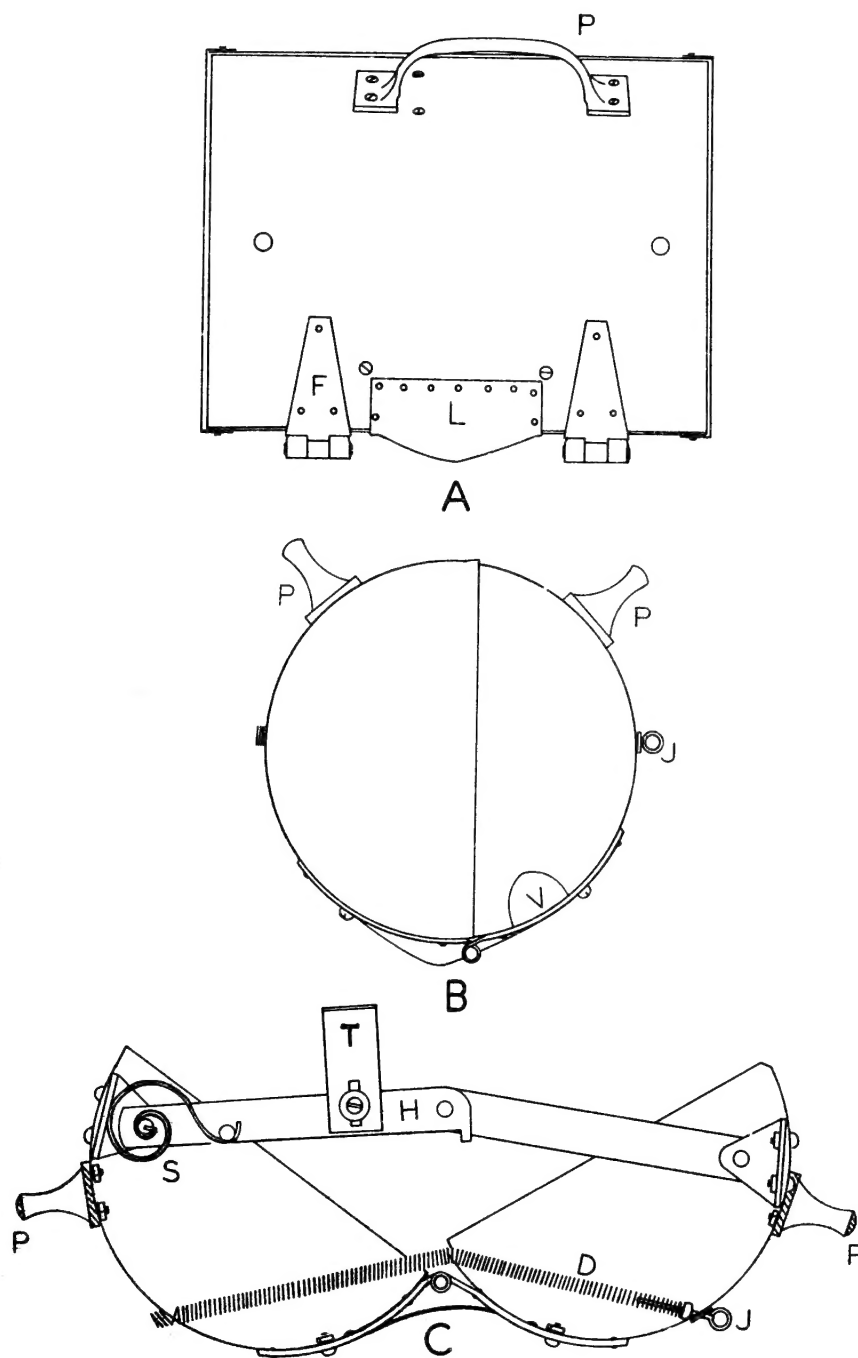


Figure 1.--Diagram of the bucket sampler. A, side view; B, end view; C, cut-away view.

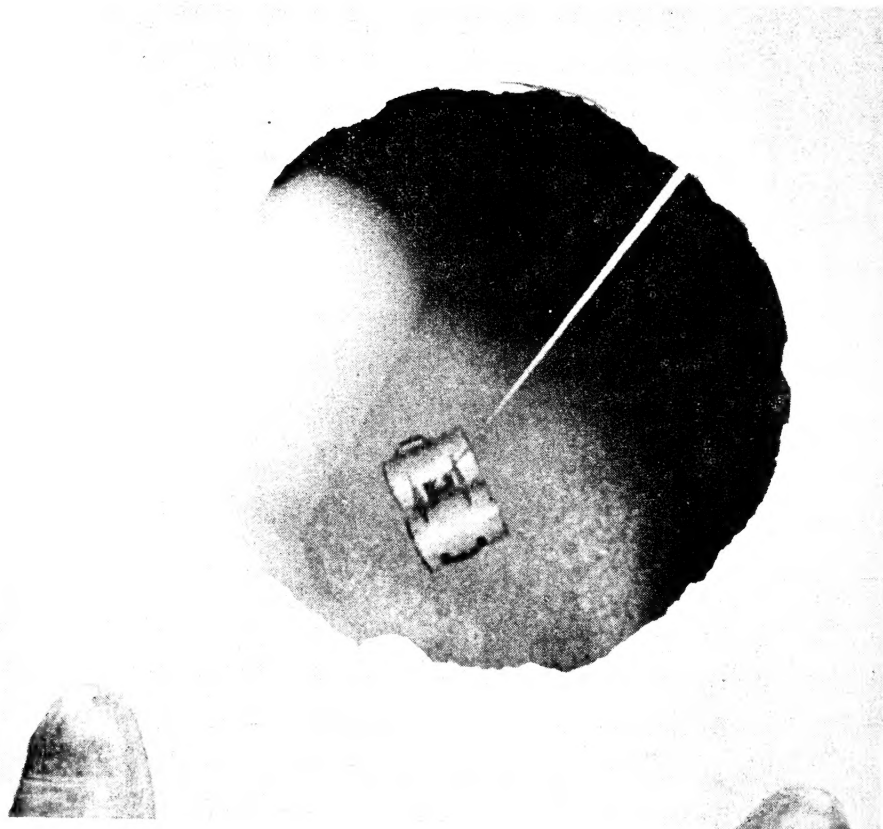


Figure 2.--Bucket sampler lowered through a manhole at the top of an elevator bin. The sampler rests on the grain surface 30 feet below, ready to be sprung and to pick up the sample.